CLAIMS

1. A method for microfabrication of polymer scaffolds comprising:

generating of an elastomer mold;

directing a polymer into the mold;

curing the biopolymer in the mold to form a two-dimensional biopolymer scaffold; and

removing the cured biopolymer scaffold from the mold.

2. The method of claim 1 wherein the elastomer is a silicone polymer.

3. The method of claim 1, wherein the elastomer is poly(dimethylsiloxane) (PDMS).

4. The method of claim 1, wherein the elastomer is an epoxy polymer.

5. The method of claim 1, wherein the polymer is a biopolymer.

6. The method of claim 1, wherein the polymer is directed into the mold by micromolding.

7. The method of claim 1, wherein the polymer is directed into the mold by microfluidics.

8. The method of claim 1, wherein the polymer is directed into the mold by spin-casting.

9. The method of claim 1, wherein the polymer is a lactic acid polymer.

10. The methed of claim 1, wherein the polymer is selected from the group consisting of poly(DL-lactic acid) (PLA), poly(DL-lactic-co-glycolic acid) (PLGA) and poly(L-lactic acid) (PLLA).

11. The method of claim 1, wherein the polymer is cured by evaporation of solvent..

12. The method of claim 1, wherein the polymer is cured by heating.

13. The method of claim 1, wherein the polymer is cured with time.

14. The method of claim 1, wherein the scaffold is coated with a coating substance selected from the group consisting of biomolecules, peptides and proteins that modulate cell adhesion.

15. The method of claim 14, wherein the coating substances promote cell adhesion.

16. The method of claim 14, wherein the coating substance is selected from the group consisting of collagen, fibronectin, vitronectin, Arg-Gly-Asp (RGD) and Tyr-ile-Gly-Ser-Arg (YIGSR) peptides, glycosaminoglycans (GAGs), hyaluronic acid (HA), integrins, selectins and cadherins.

17. The method of claim 14, wherein the coating substances inhibit cell adhesion.

18. The method of claim 14, wherein the coating substances comprise triblock polymers.

19. The method of claim 14, wherein the coating substances are selected from a list consisting of pluronics, surfactants, bovine serum albumin, poly hydroxyethylmethacrylate, polyacrylamide, polymethymethacrylate ok

20. The method of claim 1, further comprising inducing porosity by particulate leaching by use of particles.

21. The method of claim 20, wherein the particles are selected from the list consisting of sugar, salt and protein.

22. The method of claim 20, wherein the particles are sodium chloride.

23. The method of claim 1, further comprising assembly of two-dimensional scaffolds into three-dimensional structures by lamination.

24. The method of claim 23, further comprising the attachment of the two dimensional structures to eachother by applying mechanical pressure and heating.

25. The method of claim 23, further comprising the attachment of the two dimensional structures to eachother by the use of solvents.

26. The method of claim 23, further comprising the attachment of the two dimensional structures to eachother by the use of adhesives.

27. The method of claim 26, wherein the adhesives comprise PDMS.

28. The method of claim 1, further comprising growth of cells on biopolymer scaffolds.

29. The method of claim 28, wherein the cells are eukaryotic cells.

30. A polymer scaffold microfabricated by a method comprsing:
generating of an elastomer mold;
directing a polymer into the mold;
curing the polymer in the mold to form a two-dimensional polymer scaffold; and
removing the cured polymer scaffold from the mold.

31. A microfabricated polymer scaffold comprising a contuous membrane comprised of a surface with varying topology.

32. A microfabricated polymer scaffold comprising a continuous membrane mesh comprised of open area with intervening polymer.

33. A cell culture method comprising:

microfabrication of a polymer scaffold;

contacting the biopolymer scaffold with cells and an appropriate growth medium under conditions for cell growth; and

incubating the cells under appropriate conditions for cell growth.